

REMARKS

The title has been amended as required.

The drawings are objected to for not showing every feature of the invention specified in the claims. Applicants respectfully traverse these objections.

Claim 4 does not include the expression "continuously sampling," which the Office Action states is not shown in the drawing. In claim 7, the term "threshold" has been amended to "threshold value," which is shown in Figs. 6 and 8, for example. With respect to claim 11, the mode selection signal 42 from the MPU 28 is shown in Fig. 3, for example.

Concerning the "operation mode switching circuit," the specification describes that the MPU 28 serves as the "operation mode switching circuit" (see page 11, lines 35-36). The MPU 28 is shown in Fig. 3. Regarding the "convergence time setting circuit" described in claims 12 and 13, the specification describes that the MPU 28 serves as the "convergence time setting circuit" (see page 24, lines 20-21). The MPU 28 is shown in Fig. 3. Claim 16 has been amended to more clearly describe the present invention. As described in the specification, the MPU 28 serves as the circuit described in claim 16 (see page 27, lines 1-31). In claim 17, the "normalization circuit" which performs normalization, i.e., the gain adjustment process, is shown by the gain adjustment circuit 238 shown in Fig. 3 (see page 27, line 32 to page 28, line 15 of the specification for support).

Claims 1-18 stand rejected under 35 U.S.C. § 112, first paragraph, as being a single means claims. Independent claims 1, 18 and 19 have been amended in readily ✓

apparent manner to overcome this rejection. Withdrawal of the rejection is respectfully requested.

Claims 2-9, 11-16, 19 and 20 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The claims have been amended to overcome this rejection. Withdrawal of the rejection is respectfully requested.

Claims 1-20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Shih et al. Applicants respectfully traverse this rejection.

586573

The rejection of all claims is based on the European Search Report which puts the Shih et al. reference in the “X” category. The Office Action states that since no material amendments to the claims have been made, that the rejection is “repeated for the reasons stated in the submitted EP Report.” Applicants respectfully submit that the EP Report does not provide any reasons for placing the Shih reference in the “X” category. Moreover, the Shih et al. reference has not yet been examined on the merits by the European Patent Office. Therefore, it is unknown whether the claims will even be rejected by the Shih et al. reference during the examination stage. As the Office Action does not state substantive basis for the §102(b) rejection, applicants respectfully submit that the rejection is improper.

To expedite prosecution, however, Applicants offer the following comments distinguishing the present invention from the Shih et al. reference.

Shih et al. merely discloses a sampled-data timing recovery circuit having an analog-to-digital converter (ADC) provided with first comparators which sample a reference input signal. A digital-to-analog converter (DAC) is connected to second comparators which

are a subset of the first comparators. A timing circuit controls sampling of the reference input signal based on a control signal which is generated by the DAC. The second comparators provide an intermediate signal which directly drives the DAC in response to the reference input signal, so that the DAC generates the control signal. A phase error is calculated using two sampled values, as described in column 2, line 60 to column 3, line 56. For this reason, it is necessary to take measures against an offset of an input signal with respect to the reference input signal.

On the other hand, the present invention calculates a phase error of the clock signal based on a difference between first and second sampled values and a difference between second and third sampled values of consecutive first, second and third sampled values of the readout signal. In other words, the present invention calculates the phase error using three consecutive sampled values. For this reason, unlike Shih et al., it is unnecessary to take into consideration the offset of the readout signal when calculating the phase error.

These features of the present invention are recited in independent claims 1, 18 and 19. Accordingly, claims 1, 18 and 19 and their dependent claims are allowable over Shih et al.

Claims 1, 3-7, 10, 17 and 18-20 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Hamada et al. Applicants respectfully traverse this rejection.

Hamada et al. merely discloses a clock matching apparatus having a difference unit that generates a difference in timing phase (i.e., a phase error) between an edge sample

and a sync level which is used as a reference signal level. Hence, the phase error can only be obtained at the edge portion.

On the other hand, the present invention calculates a phase error of the clock signal based on a difference between first and second sampled values and a difference between second and third sampled values of consecutive first, second and third sampled values of the readout signal. In other words, the present invention calculates the phase error using three consecutive sampled values. For this reason, unlike Hamada et al., it is unnecessary to use a sync level when calculating the phase error, and it is possible to obtain the phase error at portions other than the edge portion.

These features of the present invention are recited in independent claims 1, 18 and 19. Accordingly, claims 1, 18 and 19 and their dependent claims are allowable over Hamada et al.

Claims 2, 8-9 and 11-16 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hamada et al. in view of Shih et al. Applicants respectfully this rejection.

Hamada et al. and Shih et al., alone or in combination, fail to teach or suggest the subject matter of the base claim 1, as discussed above in separately traversing the rejections of these references. For this reason, claims 2, 8, 9 and 11-16, which depend from claim 1, are allowable over Hamada et al. and Shih et al.

For all of the above reasons, Applicants request reconsideration and allowance of the claimed invention. The Examiner should contact Applicants' undersigned attorney if a telephone conference would expedite prosecution.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By



B. Joe Kim
Registration No. 41,895

May 14, 2004

Suite 2500
300 South Wacker Drive
Chicago, Illinois 60606
(312) 360-0080
Customer No. 24978